

CS4400 Database Project: Georgia Restaurant Health Inspection System

Summer 2015

Project Overview

The purpose of this project is to analyze, specify, design, implement, document, and demonstrate a database management information system called the Georgia Restaurant Health Inspection System. The project will proceed in three phases as outlined in the Classical Methodology for Database Development: Analysis & Specification, Design, and Implementation & Testing. The system should be implemented using a Database Management System (DBMS) that supports standard SQL queries. Class administrators will provide you with information about how to access a college-managed MySQL server in order to implement your database. Your professor must approve alternative implementations. Under no circumstances may you use a tool that automatically generates SQL or automatically maps programming objects into the database.

The three phases of the project cover the following work-processes from the Classical Methodology for Database Development. The due dates for each phase appear in the table below.

Phase	Phase Description	Due Date
I	Analysis & Specification	June 9
II	Design	June 25
III	Implementation & Testing	July 21
	Demonstration	July 22-24

Groups

Project groups must have 2 or 3 members. A group may remove a member from further participation in the group when phase I is turned in or when phase II is turned in. A written notification must be provided to the professor at that time.

Phase I – Analysis & Specification

The phase I deliverables include:

1. A cover page including the name, class section, email address, and T-Square username of each group member.
2. A list of contributions of each team member.
3. An Information Flow diagram showing the primary documents and tasks of the system and the flow of data among them. An example of this deliverable can be found in **Appendix B – Sample EER Diagram**.
4. The data model for your system in the form of an Enhanced Entity Relationship (EER) diagram. The EER diagram must capture the constraints of the system as fully as possible. For example, all relationship types should have cardinality constraints, all keys should be identified, and total participation constraints should appear where applicable. An example of this deliverable can be found in **Appendix B – Sample EER Diagram**.
5. A list of business constraints that will be enforced. Do not include any constraints that can be shown in the EER diagram, but rather business logic related constraints that cannot be expressed in EER. The constraints should be written in terms of the Entity Types, Relationship Types and Attributes of your EER diagram. An example of this deliverable can be found in **Appendix C – Sample Constraints**.
6. A list of any assumptions made, including explanations. You are allowed to make up additional reasonable assumptions and constraints as long as they do not conflict with the specified constraints and requirements. If possible, those additional assumptions and constraints should be included in the EER diagram.

Phase II – Design

The phase II deliverables include:

1. A coverage page including the name, class section, email address, and T-Square username of each group member.
2. A list of contributions of each team member.
3. A relational schema diagram with primary and foreign keys identified and referential integrity shown by arrows. An example of this deliverable can be found in **Appendix D – Sample Relational Model Diagram**.

4. `CREATE TABLE` SQL statements, including domain constraints, integrity constraints, primary keys, and foreign keys. An example of this deliverable can be found in **Appendix E – Sample CREATE TABLE Statements**.

Phase III – Implementation & Testing

There are two options for phase III: lightweight and heavyweight. The *lightweight* option requires a demonstration of working SQL statements that could be used to perform all tasks specified in the project description (i.e., the set of tasks identified in the Information Flow diagram). The queries will be executed against a database created by each group and pre-populated with sample data. A query interface such as phpMyAdmin or the MySQL Query Browser will be used to execute your queries.

The *heavyweight* option is to implement a working application including a graphical user interface (GUI) with all functionality described in the project description. Under this option, the SQL statements will be embedded in a host language, such as PHP or Python.

For both lightweight and heavyweight options, you will need to generate sample data for your database, which will be used for your demo.

The deliverables for phase III include:

1. A cover page including the name, class section, email address, and T-Square username of each group member.
2. A list of contributions of each team member.
3. A relational database pre-populated with sample data.
4. A set of working SQL statements for all tasks (*lightweight option*).
5. A functional application with embedded SQL statements (*heavyweight option*).

Grading

In addition, when phase 3 is submitted, each group member will need to sign and submit the following statement:

I certify that I have contributed XX% of effort to the overall project and I agree to be graded accordingly.

Signed: _____

The XX value should ideally be the same for all members of the project, however if one or more of you do not pull your weight during the project you should list an accordingly smaller percentage.

The Database Application Description

Overview of the Georgia Restaurant Health Inspection System (GRHI)

The Georgia Restaurant Health Inspection system (GRHI) is a database application for managing and sharing information about health inspections for restaurants in the state of Georgia.

The Georgia Department of Health Services (GDHS) inspectors conduct unannounced inspections of all food service establishments. The ultimate goal of GDHS is to protect the public by preventing food-borne illnesses. GDHS has contracted with CS 4400 to develop a database system to store all related data about the inspections in a publicly accessible database which can be updated/queried online.

Each food service establishment in the state of Georgia is inspected at least once every twelve months and additional inspections are made as necessary based on the public health risks posed by the establishment and the establishment's past compliance history. The inspector may enter any food establishment at any reasonable time after proper identification. They are also permitted to examine the records pertaining to food and supplies purchased, received or used, or to persons employed.

During the inspections, the inspectors evaluate food handling practices, how food is received and stored, how food is prepared, processed and served, how is food cooked, held and cooled for future use. The inspectors also check for deficiencies in the facilities and pest related violations. After conducting an inspection of a restaurant, the inspector will calculate a score based on the violations observed. Violations can fall into two categories:

- **Critical:** Violations that directly relate to the transmission of food borne illnesses, the adulteration of food products and the contamination of food-contact surfaces.
- **Noncritical:** Violations that are of a moderate/low risk to the public health and safety.

The findings of an inspection are to be recorded in a database. The inspection report and related information are public record and can be reviewed by anyone.

The GDHS inspection is based on a 15-item checklist. Eight of those items are considered "critical" and address areas where there is a high likelihood of illness if left uncorrected. Appropriately, these critical items are weighed heavier in our analysis. The remaining seven "non-critical" items measure construction and overall cleanliness. When totaled, the 15 checklist items together add up to a perfect score of 100. Each of the eight (8) critical items has a perfect score of 9 and the seven (7) noncritical items have a perfect score of 4.

To pass the inspection, food establishments must have a score of 75 or better and have no critical item score less than 8. If these criteria are not met, the establishment will be asked to voluntarily close its doors until it can open again in full compliance as shown by passing a subsequent inspection.

Inspection Checklist items (first 8 are critical items)

1. The food is in good condition and safe for human consumption
2. Potentially hazardous food is stored, prepared, displayed and served according to specified time and temperature requirements
3. Cross-contamination is prevented
4. Personnel with infections or communicable diseases are restricted from handling food
5. Personnel wash hands and use good hygienic practices
6. Food equipment and utensils are properly sanitized
7. Hot and cold water is from a safe and approved source
8. Insects, rodents and other animals are kept out of the restaurant
9. Proper equipment is used to maintain product temperature
10. Gloves or utensils are used to minimize handling of food and ice
11. Dishwashing facilities are properly constructed and maintained
12. Restrooms are clean, properly maintained
13. Rubbish containers are covered and properly located
14. Outside garbage disposal areas are enclosed and clean
15. Non-food contact surfaces of equipment and utensils are clean and free of contaminants

The key players in this system are restaurants, inspectors and customers. Restaurants are required to have a current Health Permit issued yearly by the state and a passing Health inspection score to be able to operate. Information about the restaurant operator is also stored in our system. All restaurants also have a unique state ID identifying the establishment in the state of Georgia. Other related information will be shown in the GUI for entering restaurants into the system. The second type of player is the Inspector. Each inspector has a unique state health inspector ID and an associated name and telephone number. The third type of player is the Customer. Customers are included because our system will allow customers of a restaurant to enter food/safety complaints about the restaurant. We do not include general restaurant reviews. Customer information will include contact information such as name and telephone number.

The following sections contain a functional description of the GRHI application along with some very simple screen mockups. We should note that we will not implement a complete real-world system for this application but rather a subset of the system that is described in this document. *The user interfaces depicted in this project description merely serve as examples to guide your thinking.* Your project's interface may look completely different and that is fine—even encouraged! For example, you might choose to split up some interfaces we have shown on a single screen into multiple screens. You might choose to use popup windows instead of refreshing the page. A complete reorganization of the user interface is

acceptable as long as your application supports the same functionality as described below. If you choose the heavyweight option, you may implement the project as a traditional standalone application (e.g., using Python or Java GUIs) or as a web application (e.g., using a web scripting language like PHP). Your project is not graded on its aesthetic appeal, but on its functionality as it relates to the application requirements.

Logging In

The GRHI login screen is shown in Figure 1. Restaurant operators and state health inspectors can log into the system and are required to enter a password for the security of the database. Others who are just looking for restaurant inspection reports/scores can simply login in as a guest. In addition a customer who wishes to file a complaint about a restaurant can also login as a guest. We will assume that restaurant operators and inspectors have received a user name and password from the State Health Department and that action is outside the scope of our system. When applying for a username/password

- the restaurant operator is required to submit their name (first and last), phone and email. This information will be stored in the database.
- the health inspector is required to submit their name (first and last), and phone. This information will be stored in the database.

If invalid login credentials are input by a restaurant operator or inspector, an error message should be displayed and the user should be asked to retry.


Georgia		Restaurant Health Inspections	
			
Guest		<input type="button" value="Login"/>	
Restaurant Operator		/ Health Inspector	
User Name		<input type="text" value="gdhs1001"/>	
Password		<input type="password" value="*****"/>	
		<input type="button" value="Login"/>	

Figure 1 – General GRHI Login Screen

Guest Access

After a guest logs in to GRHI, he or she is directed to the Guest Menu. The Guest Menu (**not shown**) gives the user two general options: searching for restaurants and filing a complaint. In addition the user may exit the system from this screen. The first option (figure 2a) allows users to find a restaurant(s) based on the conjunction of health inspection score and zipcode with (0, 1 or both) of the following: restaurant name, cuisine. With score, there is a dropdown box that allows the comparison to be less than or greater than. The cuisine option is also a dropdown box where the user can choose from a list of cuisines. The search result is shown in Figure 2b where restaurants are listed in descending order of score.



Georgia Restaurant Health Inspections				
Restaurant Search				
Name	<input type="text"/>			
Score*	<input type="text" value="95"/>	>		
Zipcode*	<input type="text" value="30332"/>			
Cuisine	<input type="text" value="Italian"/>			
* Required Condition				
<input type="button" value="Submit"/>		<input type="button" value="Cancel and Return to Previous Screen"/>		

Figure 2a – Restaurant Search

Georgia Restaurant Health Inspections				
Restaurant	Address	Cuisine	Last Inspection Score	Date of Last Inspection
Veni Vidi Vici	33 Peachtree St, Atlanta, GA 30332	Italian	100	2015-01-21
La Tavola	77 Highland Ave, Atlanta, GA 30332	Italian	98	2014- 11-15
Baraonda	101 Howell Mill Rd, Atlanta, GA 30332	Italian	98	2014-08-01
Papinos	555 Virginia Ave, Atlanta, GA 30332	Italian	96	2015-03-30
				<input type="button" value="Return to Previous Screen"/>


Figure 2b – Restaurant Search Results

The second option (figure 3) allows a user to enter food/safety complaint information about a restaurant. Once the information has been submitted, the user is returned to the previous screen, i.e., the Guest Menu.

Georgia Restaurant Health Inspections

Food/Safety Complaint

Restaurant	Street	City, State	Zipcode
Casa Barron	111 Broad St	Atlanta, GA	30311



Date of Meal yyyy-mm-dd	Customer First Name	Customer Last Name	Customer Phone	Complaint Description
2014-11-01	John	Smith	404-123-4567	I saw a mouse run into the restaurant's kitchen.

Submit

Cancel and Return to Previous Screen


Figure 3 – Food/Safety Complaint Screen

Restaurant Operator Access

After a restaurant operator logs in to GRHI, he or she is directed to the Restaurant Operator's Menu. The Restaurant Operator's Menu (**not shown**) gives the user two general options: inserting information about their restaurant (figure 4) and displaying health inspection report results for the last two inspections (figures 5a and 5b). Once the information is submitted in figure 4, the system will generate a unique ID for the restaurant. In Figure 5a, the user will select the search criteria from a dropdown that lists all the restaurant information associated with him/her.

Georgia Restaurant Health Inspections

Enter All Information

Health Permit ID	Health Permit Expiration Date yyyy-mm-dd	Cuisine	
451996744	2015-12-20	French	

Restaurant Name	Address Street, City, State, Zipcode	County	Restaurant Phone
Bistro Niko	111 Broad St, Atlanta, GA 30332	Fulton	404-456-1122


Submit

Cancel and Return to Previous Screen

Figure 4 – Restaurant Information Input Screen

Georgia Restaurant Health Inspections

Select Search Criteria

Restaurant ID	Restaurant Name	Address	
777113344	Bistro Niko	111 Broad St, Atlanta, GA 30332	

Submit

Return to Previous Screen

Figure 5a – Restaurant Health Inspection Search Criteria

Georgia Restaurant Health Inspections

Inspection Results

		2014-11-01	2014-12-01
Item Number	Item Description	Score	Score
1	The food is in good condition and safe for human consumption	9	9
2	Potentially hazardous food is stored, prepared, displayed according to specified time and temperature requirements	9	9
3	Cross-contamination is prevented	7	9
4	Personnel with infections or communicable diseases are restricted from handling food	8	9
5	Personnel wash hands and use good hygienic practices	8	9
6	Food equipment and utensils are properly sanitized	8	9
7	Hot and cold water is from a safe and approved source	9	9
8	Insects, rodents and other animals are kept out of the restaurant	9	9
9	Proper equipment is used to maintain product temperature	3	4
10	Gloves or utensils are used to minimize handling of food and ice	3	4
11	Dishwashing facilities are properly constructed and maintained	4	4
12	Restrooms are clean and properly maintained	2	4
13	Rubbish containers are covered and properly located	2	4
14	Outside garbage disposal areas are enclosed and clean	2	4
15	Non-food contact surfaces of equipment and utensils are clean and free of contaminants	3	4
TOTAL SCORE		86	100
RESULT		FAIL	PASS

[Return to Previous Screen](#)

Figure 5b – Restaurant Health Inspection Search Results

Inspector Access

After an inspector logs in to GRHI, he or she is directed to the Inspector's Menu. The Inspector's Menu (not shown) gives the user two general options: inserting a restaurant inspection report (figures 6a, 6b) and displaying 4 summary reports (figures 7a, 7b, 7c, 7d).

Georgia Restaurant Health Inspections

Inspector ID

111223333

Restaurant ID

777113344

Date

2015-04-21

Item Number	Item Description	Critical	Score
1	The food is in good condition and safe for human consumption	Yes	9
2	Potentially hazardous food is stored, prepared, displayed according to specified time and temperature requirements	Yes	9
3	Cross-contamination is prevented	Yes	2
4	Personnel with infections or communicable diseases are restricted from handling food	Yes	9
5	Personnel wash hands and use good hygienic practices	Yes	9
6	Food equipment and utensils are properly sanitized	Yes	9
7	Hot and cold water is from a safe and approved source	Yes	9
8	Insects, rodents and other animals are kept out of the restaurant	Yes	9
9	Proper equipment is used to maintain product temperature	No	4
10	Gloves or utensils are used to minimize handling of food and ice	No	4
11	Dishwashing facilities are properly constructed and maintained	No	4
12	Restrooms are clean and properly maintained	No	1
13	Rubbish containers are covered and properly located	No	4
14	Outside garbage disposal areas are enclosed and clean	No	4
15	Non-food contact surfaces of equipment and utensils are clean and free of contaminants	No	2

Submit

Cancel and Return to Previous Screen

Figure 6a - Inspection Report

For figure 6a, each Inspector will enter the results of their inspection of a particular restaurant as shown. Inspector information such as Inspector ID, Name (first and last) and phone number is entered in our system by the State Health Department. The inspector will enter their Inspector ID, Restaurant ID and date along with the score for each of the 15 items. To ensure data integrity, the score for items 1 through 8 should be restricted to integer values from 0 to 9 and the score for items 9 through 15 should be restricted to integer values from 0 to 4. The other information such as Item number, Item Description and Critical/NonCritical designation will be retrieved from the database for this screen.

Georgia Restaurant Health Inspections

Inspector ID

111223333

Restaurant ID

777113344

Date

2015-04-21

Item Number	Comments
3	Uncooked chicken was placed on the same surface as bread
12	Toilet was not working in bathroom
15	Napkin container was dirty

Submit

Cancel and Return to Previous Screen

Figure 6b – Item Comments for Inspection Report

In figure 6b, an Inspector can enter additional comments about the observed condition of any item on the inspection list. He/she will enter Inspector ID, Restaurant ID, Date and Item number with associated Comments.

In figure 7a, an inspector can run a summary report about restaurant inspections for a specified month and year. The summary data is organized by County and Cuisine in sorted order.

Georgia Restaurant Health Inspections --- Monthly Report

Enter Month

3

Enter Year

2015

Submit

County	Cuisine	Number of Restaurants Inspected	Number Restaurants Failed
Cobb	French	25	2
	Greek	15	5
	Italian	70	3
	Mexican	75	5
	Sub Total	185	15
Dekalb	French	0	0
	Greek	0	0
	Italian	50	3
	Mexican	50	2
	Sub Total	100	10
Fulton	French	10	0
	Greek	15	3
	Italian	25	1
	Mexican	85	3
	Sub Total	135	7
Grand Total		520	27

Cancel and Return to Previous Screen

Figure 7a – Inspection Summary Report by County/Cuisine

In figure 7b, an inspector can run a summary report about restaurant inspections for a specified county and year.

Georgia Restaurant Health Inspections -- Yearly County Report

Enter Year

2015

Enter County

Fulton

Submit

Month	Restaurants Inspected
January	100
February	100
March	135
April	200
May	150
June	150
July	225
August	150
September	175
October	100
November	150
December	225
Grand Total	1460

Return to Previous Screen

Figure 7b – Inspection Summary Report by Month for a specified Year/County

In figure 7c, an inspector can run a summary report for a specified county and year listing the restaurant with the top health inspection rating for the year by cuisine.

Georgia Restaurant Health Inspections --

Top Health Inspection Ranked Restaurants

Enter Year

2015

Enter County

Fulton

Submit

Cuisine	Restaurant Name	Address	Inspection Score
French	Bistro Niko	111 Broad St, Atlanta, GA 30332	98
Greek	Kyma	3085 Piedmont Rd, Atlanta, GA 30305	98
Italian	Veni Vidi Vici	33 Peachtree St, Atlanta, GA 30332	99
Mexican	Nuevo Laredo Cantina	1400 Chattahoochee Ave, Atlanta GA 30318	100

Return to Previous Screen

Figure 7c – Inspection Summary Report for top Restaurant by Cuisine for a Year/County

In figure 7d, an inspector can run a summary report listing restaurants and customer complaints for restaurants with number of complaints \geq a specified number of complaints and an inspection score \leq a specified inspection score on their last inspection where a less than perfect score was given on at least one critical item.

Georgia Restaurant Health Inspections --

Restaurants with Complaints (At least 1 non perfect Critical Item Score on Inspection)

Enter Year
2015
Enter Min Complaints
2
Enter Max Score
75
Submit

Restaurant Name	Address	Restaurant Operator	Operator Email	Score	# Complaints
Silver Spoon Cafe	11 Center St, Atlanta, GA 30333	Sally Martin	salmar@gmail.com	75	2

Customer Complaints:

Knife and fork were dirty

Ice machine was leaking water onto the floor

Restaurant Name	Address	Restaurant Operator	Operator Email	Score	# Complaints
Fish Fry Diner	22 Wright St, Macon, GA 30344	Jack Zee	jzee@gmail.com	55	3

Customer Complaints:

There was a dirty cloth on salad bar counter

Chef was eating while preparing food

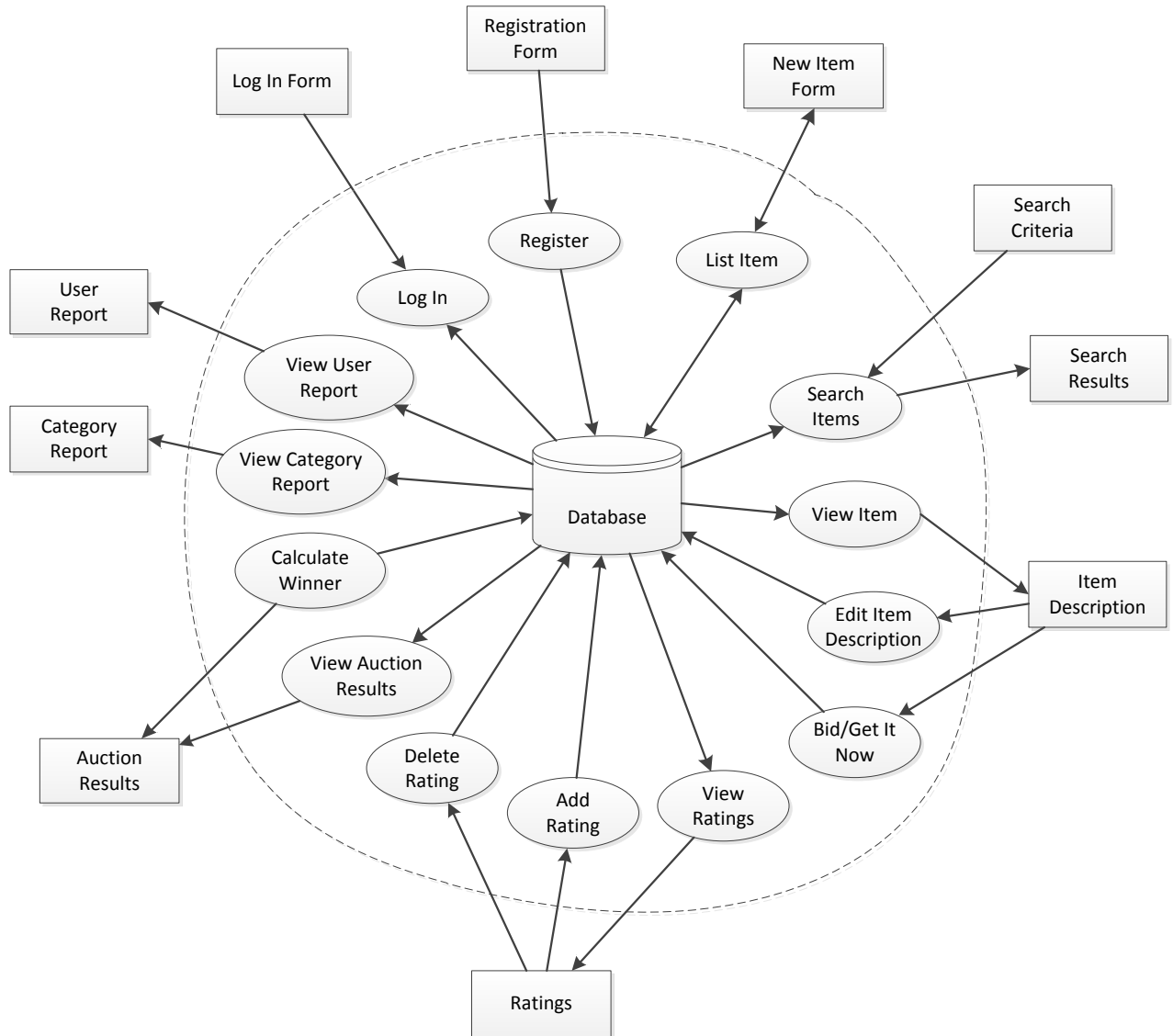
Cheese in my sandwich was moldy

Return to Previous Screen

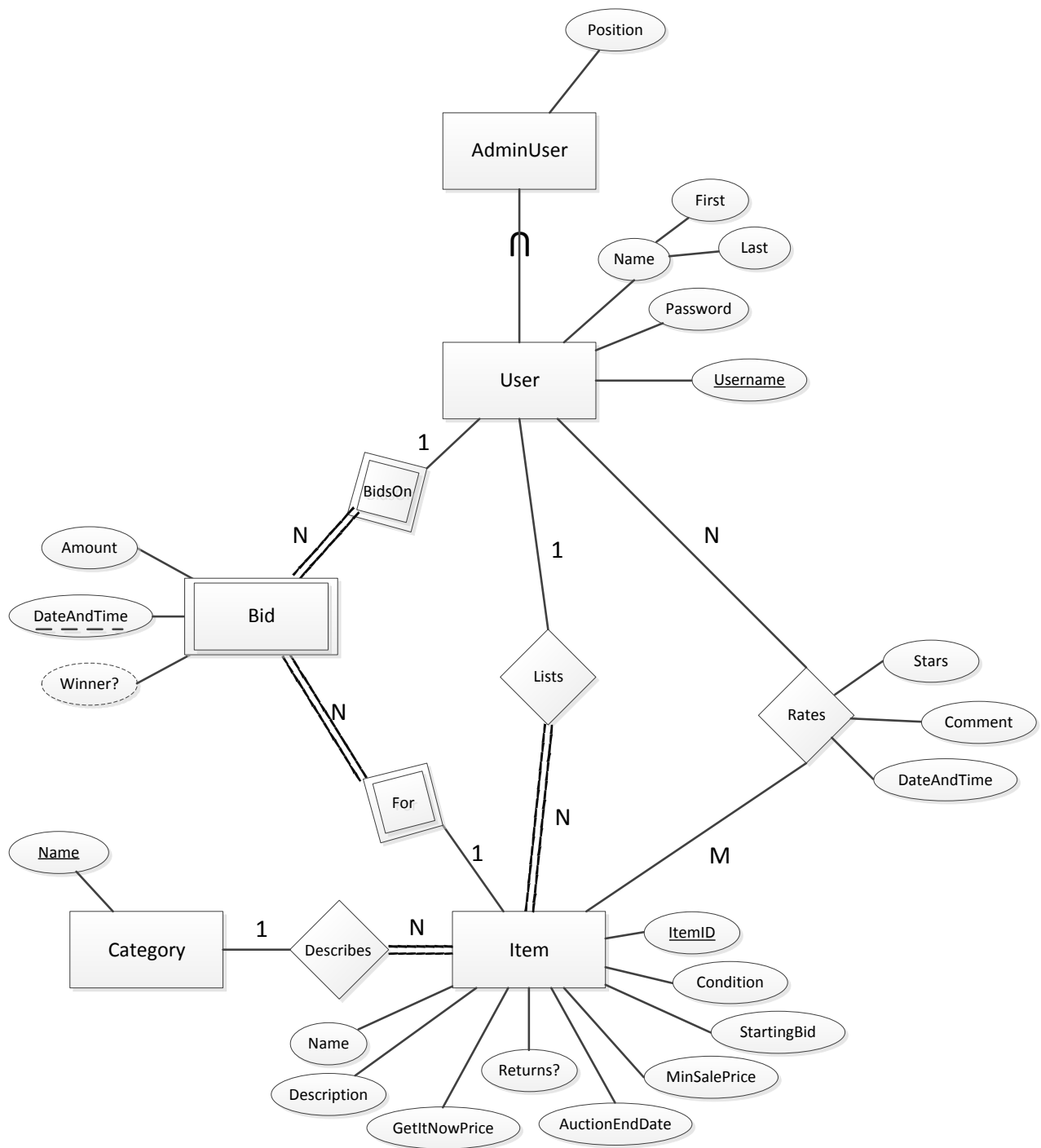
Figure 7d – Inspection Summary Report for Restaurants with Complaints

End of Database Application Description

Appendix A – Sample Information Flow Diagram



Appendix B – Sample EER Diagram



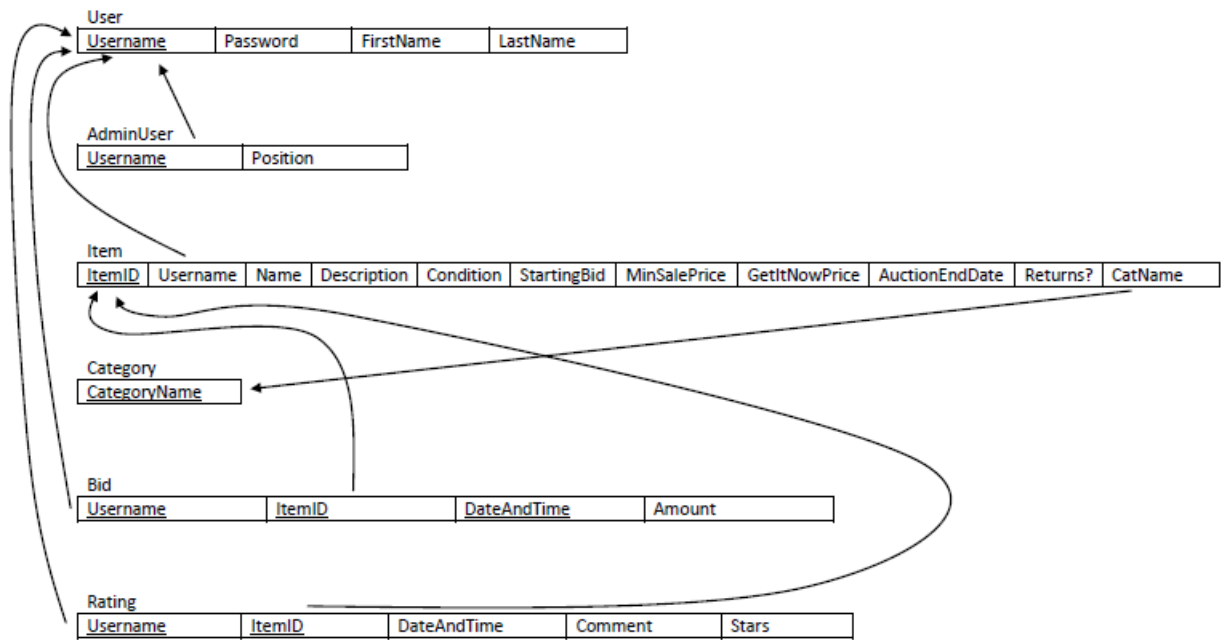
Appendix C – Sample Constraints

No.	Entity Types, Relationship Types, and Attributes involved	Constraint Definition ¹
1	Item.StartingBid ² , Item.GetItNowPrice	Item.StartingBid < Item.GetItNowPrice
2	Lists, User, Item, BidsOn, Bid, For	The user who lists an item cannot also bid on the same item.
3	Bid.Amount, Bid.DateAndTime	For any two Bids B1 and B2 on the same item, if B1.DateAndTime > B2.DateAndTime then B1.Amount > B2.Amount (Later bids must be for a greater amount than prior bids.)
4	Rates.Stars	1 <= Rates.Stars <= 5
5	Lists, User, Rates, Item	A user cannot rate an item that he or she lists.

¹ Constraint definition may be described in plain English or written using basic logic and mathematical operators.

² The notation XXX.YYY means that YYY is an Attribute of the Entity Type XXX or Relationship Type XXX.

Appendix D – Sample Relational Model Diagram



Appendix E – Sample CREATE TABLE Statements

```
CREATE TABLE User (
    Username VARCHAR(30) PRIMARY KEY,
    Password VARCHAR(30) NOT NULL,
    FirstName VARCHAR(50) NOT NULL,
    LastName VARCHAR(50) NOT NULL
)

CREATE TABLE AdminUser (
    Username VARCHAR(30) PRIMARY KEY,
    Position VARCHAR(50) NOT NULL,
    FOREIGN KEY (Username) REFERENCES User(Username)
)

CREATE TABLE Category (
    CategoryName VARCHAR(30) PRIMARY KEY
)

CREATE TABLE Item (
    ItemID INT AUTO_INCREMENT PRIMARY KEY,
    Username VARCHAR(30) NOT NULL,
    Name VARCHAR(250) NOT NULL,
    Description VARCHAR(4000) NOT NULL,
    Condition INT NOT NULL,
    StartingBid DECIMAL(10,2) NOT NULL,
    MinSalePrice DECIMAL(10,2) NOT NULL,
    GetItNowPrice DECIMAL(10,2),
    AuctionEndDate DATETIME NOT NULL,
    Returns? BIT NOT NULL,
    CatName VARCHAR(30) NOT NULL,
    FOREIGN KEY (Username) REFERENCES User(Username),
    FOREIGN KEY (CatName) REFERENCES Category(CategoryName)
)

CREATE TABLE Bid (
    Username VARCHAR(30) NOT NULL,
    ItemID INT NOT NULL,
    DateAndTime DATETIME NOT NULL,
    Amount DECIMAL(10,2) NOT NULL,
    PRIMARY KEY (Username, ItemID, DateAndTime),
    FOREIGN KEY Username REFERENCES User(Username),
    FOREIGN KEY ItemID REFERENCES Item(ItemID)
)

CREATE TABLE Rating (
    Username VARCHAR(30) NOT NULL,
    ItemID INT NOT NULL,
    DateAndTime DATETIME NOT NULL,
    Comment VARCHAR(4000) NOT NULL,
    Stars INT NOT NULL,
    PRIMARY KEY (Username, ItemID),
    FOREIGN KEY Username REFERENCES User(Username),
    FOREIGN KEY ItemID REFERENCES Item(ItemID)
)
```

Document Version Info

<u>Version</u>	<u>Notes</u>	<u>Date</u>
1.0	EO final version	5/6/2015
1.1	SN changes incorporated	5/11/2015
1.2	TA changes incorporated	5/20/2015
1.3	Monica found typo on page 13 (correction highlighted)	6/3/2015